Improving adolescent contraceptive use: Evaluation of a theory-driven classroom-based intervention

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The aim of the research was to evaluate the impact of intervention materials, designed to enhance self-efficacy and anticipated regret, on contraceptive behaviour and antecedents of contraceptive use in a sample of adolescents. It was hypothesised that materials designed to enhance self efficacy and anticipated regret would lead to improvements in outcome measures compared with controls. A 4(intervention condition) by 3(time) mixed design was used to assess the impact of intervention materials. Participants (N=414) were recruited from five secondary schools in the north of England. They were assigned to either an active control group, an anticipated regret (AR) manipulation, a self-efficacy (SE) manipulation, or both AR and SE manipulations. Outcome measures included psychological antecedents of contraceptive behaviour change, intentions and behaviour. MANOVA revealed increases across several outcome measures over time ($F[14, 287]=8.99$, $p<.001$,$\eta_p^2=.305$) including intentions, but these did not differ by condition ($F[42, 852]=1.35$, $p=.07$,$\eta_p^2=.062$). There was evidence that the questionnaires may have caused reactivity in participants. Amongst sexually active participants with relatively low levels of intention to use contraception at the outset, increases in several outcome measures including intention and behaviour were observed ($F[3, 35]=10.359$, $p<.001$,$\eta_p^2=.47$). Findings support the potential for effective delivery of behaviour change theory-driven interventions in classroom settings. The possibility that the questionnaires may have acted as a form of intervention contributes to recent discussion of this issue in the literature, and the findings also strengthen the case for post-decisional and behavioural skills interventions to enhance behaviour amongst those already motivated to use contraception.

Keywords: adolescents; contraceptive; evaluation; intervention; sex education

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In 2008, 38 750 under 18 year-olds conceived in England alone, and just over half led to live births (ONS, 2010). Despite evidence of modest decline these rates remain the highest in Western Europe (ONS, 2010). Rates of sexually transmitted infections (STIs) amongst adolescents continue to increase (HPA, 2010). The National Teenage Pregnancy Strategy (Social Exclusion Unit [SEU], 1999) aimed to halve rates of conception amongst under 18s by 2010 (from a 1998 baseline), but this has not been achieved. Similarly, the National Strategy for Sexual Health and HIV aimed to reduce the transmission of STIs amongst young people (DH, 2001) but there is no evidence yet of decline (HPA, 2010).

In 1999, the SEU recommended good sex education, 'in schools and other places where young people can be reached' (SEU,1999; p7) and in 2008, it was announced teaching Personal Social and Health Education (PSHE) including sex and relationships education (SRE) will become statutory as part of the national curriculum in schools by 2011 (DCSF, 2008)[1]. Even *good* sex education however, based largely on developing knowledge and skills, is likely to be insufficient to instil consistent safer sex behaviour in young people (e.g. Abraham, Sheeran, Spears & Abrams, 1992; Richard & van der Pligt, 1991; Henderson, Wight, Raab et al., 2007). The National Institute for Health and Clinical Excellence (NICE) has made recommendations that behaviour change theory and evidence be embedded within sexual healthcare practice (NICE, 2007), and arguably if sex education is to be effective in helping to reduce conception and STI rates in young people, a theory-driven approach to SRE provision should be considered.

Considerable research has highlighted processes underpinning motivation and behaviour change in relation to condom and contraceptive use (e.g. Albarracín, Gillete, Earl, Glasman & Durantini, 2005; Beadnell, Baker, Gillmore et al., 2008) and there is growing

[1] At time of writing these plans have been put on hold during the change of UK Government in 2010.

interest in the importance of volitional (Gollwitzer, 1993) or post-intentional (Abraham, Sheeran, Norman et al., 1999) processes in relation to contraceptive behaviour (Brown, Abraham, Joshi & Wallace, 2008; Martin, Sheeran, Slade, Wright & Dibble, 2009). Motivational processes are arguably of greatest relevance however, in classroom-based sex education, since audiences will likely have varying levels of sexual and contraceptive knowledge and experience, and must feel motivated to engage in safer sex behaviours consistently, (and have become sexually active) before they will require help translating motivation into action (Abraham et al., 1999; Gollwitzer, 1993). Therefore, two variables, self-efficacy and anticipated regret, identified in our research on similar samples as more strongly related to motivational and behavioural change for contraception than a range of others (Brown, 2006; Brown, Hurst & Arden, 2004) were selected as the focus of the present study. These variables have also received support more widely in the literature (e.g. Abarracín et al., 2005; van Empelen, Kok, Jansen & Hoebe, 2001).

Rationale and aims

Given that Government targets to reduce teenage pregnancy and rates of STI have not been met in the UK, and that SRE is likely to become a statutory part of the school curriculum, it is arguably valuable to explore the potential contribution attempts to manipulate variables such as self-efficacy and anticipated regret might make to the delivery of classroom-based sex education. Testing brief interventions that could be provided in addition to current provision is arguably also of value. The present study therefore evaluated the effect of brief paper and pen-based tasks on psychological antecedents of contraceptive behaviour and on self-reports of contraceptive behaviour over a four-week period. It was predicted that there would be a significant interaction between time and condition indicating interventions designed to increase self-efficacy and anticipated regret result in improved motivation and behaviour compared to controls.

Method

Participants

All local education authority schools were invited to participate. Five schools taking pupils aged 11 to 18 years responded and volunteered year groups to participate. Four schools were attended by mainly white pupils. Almost half of pupils from the remaining school were from ethnic minority groups. Two schools recruited pupils from mainly affluent backgrounds, two from areas with high social and economic deprivation and one from average levels of socio-economic status. Of 414 participants who completed a baseline questionnaire, 247 participants (126 males) completed the intervention and questionnaires at time 2 (T2) and time 3 (T3). Attrition was due to absence from school at either one or both follow-up time points or anonymous withdrawal through non-completion. Table 1 provides further descriptive information about participants at time 1 (T1) and T3.

Insert table 1 about here

Design

A 4(condition) x 3(time) mixed design was used. Participants were assigned to one of four intervention conditions (information-only control [IOC], self-efficacy [SE], anticipated regret [AR], or SE/AR combined), and measured on eight dependent variables across three time points (baseline/T1, immediately post-intervention/T2, and four-week follow-up/T3). The dependent variables were contraceptive behaviour (non-virgins only), intention, self-efficacy, anticipated regret, control beliefs, condom outcome beliefs, pill outcome beliefs, and normative beliefs. Counterbalancing was used for the SE/AR combined condition.

Materials

Questionnaire

Two questionnaires were developed. They differed only in making items gender appropriate. A participant-generated code of letters and numbers from personal information maintained anonymity and allowed data-matching across time points.

Background measures

Participants were asked to indicate their age, whether they had engaged in sexual intercourse, any religious beliefs affecting contraceptive decisions, and whether they had a) never had sex, b) had sex but not during the previous six months, or c) had sex within the last 6 months.

Psychological and behavioural measures

Measures used seven-point Likert scales to record responses. Participants responded in relation to their main method of contraception (or one they knew most about). Self-efficacy was measured using seven items adapted from Grimley, Prochaske and Prochaske (1997). Examples are, 'How confident are you that you will use a contraceptive method effectively every time you have sex?' and 'How confident are you that you will use a contraceptive method effectively if you have been drinking or taking drugs?' with possible responses ranging from '1 – very unconfident' to '7 – very confident'. A mean of these items comprised a reliable measure (Cronbach's α =.83).

Anticipated regret was measured in two ways. First, five items assessed regret following non-use of contraception and feelings about having a pregnancy. Example items are, 'If you had sex and did not use your chosen method of contraception, how much do you think you would regret it the next day?' and 'How much do you like the idea of being pregnant at this stage of your life?' with possible responses ranging from '1 – not at all' to '7 – very much'. Second, participants were asked to think about a sexual experience where they had a) used contraception properly and b) not used contraception. If they lacked experience

of these scenarios, they were asked to imagine them, and completed four semantic differential scales to represent assessment of feelings after having sex when contraception was used and not used properly (e.g. 1 ‘unhappy’ to 7 ‘happy’, 1 ‘not worried’ to 7 ‘worried’). A mean score provided a reliable composite measure (Cronbach's α=.83).

Theory of planned behaviour (TPB; Ajzen, 1991) beliefs were measured to assess intervention effect. Belief strength and outcome evaluation were measured for condoms (six paired items) and the pill (five paired items; see Conner & Norman, 2005). Example items include, ‘Using a condom would make sex feel safer’ multiplied by ‘Feeling that sex is safe is…’ and ‘Taking the pill would be an easy way to prevent pregnancy’ multiplied by ‘Contraception being easy is …’ scored in each case from 1 ‘very likely’ to 7 ‘very unlikely’ multiplied by 1 ‘very good’ to 7 ‘very bad’. Analyses showed these items formed reliable measures for condoms (Cronbach's α=.79) and the pill (Cronbach's α=.8).

Normative beliefs and motivation to comply were measured using five paired items. An example item is, ‘My friends think I should use contraception every time I have sex’ multiplied by ‘With regard to contraception, how much do you want to do what your friends think you should?’ scored from, ‘1 ‘strongly agree’ to 7 ‘strongly disagree’, multiplied by, 1 ‘not at all’ to 7 ‘very much’. Normative belief measures tend to be less reliable than other TPB measures (e.g. Armitage & Conner, 2001) and those reported here reflect that (Cronbach's α=.59). However, similar levels have been reported elsewhere (e.g. van Empelen et al., 2001) and are likely explained by varying levels of importance placed on different referent groups.

Control beliefs and power were measured using nine items including external and internal influences. Example items include, ‘How often is your use of contraception affected by you taking drugs or alcohol?' multiplied by, 'If I have used drugs or alcohol before having sex, it makes my contraceptive use...' and ‘How often does your excitement or level of

arousal during a sexual experience affect your use of contraception?' multiplied by 'My excitement or level of arousal during a sexual experience makes my contraceptive use…' scored from, '1 'never' to 7 'always', multiplied by 1 'much less likely' to 7 'much more likely'. The mean of these multiplicative items provided a reliable measure (Cronbach's α=.74).

Intention was measured using three items, e.g., 'I intend to use a method of contraception effectively every time I have sex' scored from '1 'strongly agree' to 7 'strongly disagree'. The mean of these items provided a composite measure (Cronbach's α=.93).

Contraceptive behaviour of non-virgins was measured with a single item at baseline, 'I have used contraception properly every time I have had sex in the last 6 months scored from '1 - strongly disagree' to '7 - strongly agree'. At T3, the same question was asked in relation to the preceding month.

Intervention materials

The intervention materials were reading and writing based tasks. Three different sets were produced; a four-page set that gave factual information about condoms and the contraceptive pill (IOC condition); a four-page set designed to enhance feelings of control over pill and condom use (SE condition); a five-page set of vignettes designed to enhance feelings of anticipated regret over not using contraception properly (AR condition). The SE/AR condition received both sets. The intervention materials are at http://www.healthinterventions.co.uk/interventions/intro.aspx?section=15. These materials were laminated, and accompanied by an OHP pen so that participants could write directly on them (aiding and recording engagement with the intervention).

Procedure

Ethical approval was sought before data collection began from the university ethics committee. Questionnaires and the intervention were administered by the first author. Participants were seated in classrooms with enough distance between them to maintain privacy. At T1, questionnaires were distributed for completion, and sealed in envelopes before being returned. One week later, participants completed the intervention. Envelopes, each containing evenly dispersed materials for one intervention condition, a questionnaire and OHP pen were taken to each T2 data collection session. The envelopes were marked only with gender, and blindly distributed. Participants were instructed to complete the laminated 'workbook' first using the pen provided, and then complete the questionnaire. Materials were re-sealed in envelopes before being returned (enabling later identification of assigned condition). Four weeks later, participants completed a T3 questionnaire.

Analysis

Representativeness check

An independent samples t-test suggested that participants who were lost from analyses (at T2 and/or T3) were significantly younger (mean=16.31 years; SD 1.39 years) than those retained (mean =16.95 years; SD=1.52 years); t (376.134)= -4.44, p<.001. Although the difference was significant, it is relatively small (d =.44), and suggests greater absenteeism amongst younger students.

Chi-square analyses found a statistically significant association between gender and attrition (χ^2 =7.56, df=1, p=.006). A greater proportion of males were lost from the study compared with females. However, a greater loss of males was anticipated, based on previous research (e.g. Brown, Hurst & Arden, 2004), and more males initially recruited, leaving approximately equal numbers in the final sample. No statistically significant association was

found between attrition and virgin status (χ^2 = 3.59, *df*=1, *p*=.166). Therefore, comparable proportions of virgins and non-virgins remained in the final sample.

Randomisation check

Table 2 compares baseline descriptives by intervention condition. ANOVA was used to see if participants differed in age by condition at baseline (T1). Analysis suggests they did not (F[3, 311]=.62, *p*=.97). Chi-square analyses assessed association between gender and condition at T1, and between virgin status and condition at T1. No significant association was found for gender (χ^2[3]=.615, *p*=.893), or virgin status (χ^2[3]=1.973, *p*=.578).

Table 2 about here

A between-subjects MANOVA carried out on the T1 DVs, with condition as the between-subjects IV, showed that there were significant differences at T1 (F[24, 870.69]=1.77, *p*=.014). Univariate analyses suggested differences occurred only on the baseline measure of intention (F[3, 307]=3.17, *p*=.025). Bonferroni post-hoc comparisons suggest differences were attributable to a intention in the AR condition (mean=5.43) and the SE/AR condition (mean=6.01). This difference at baseline was adjusted for, by following MANOVA with ANCOVA using the baseline measure of intention as a covariate. This confirmed that significant effects for intention reported below were retained after accounting for differences at baseline.

Effect of intervention on the whole sample (by gender)

Table 3 shows the means and standard deviations of participants' scores on DVs by intervention condition and gender. Because of a difference between males' and females' scores, gender was included as a between-subjects variable in initial analysis to assess differential effect. A 4(condition) x 3(time) x 2(gender) MANOVA conducted on 7 DVs (intention, self-efficacy, anticipated regret, pill outcome beliefs, condom outcome beliefs,

control beliefs and normative beliefs), showed a significant main effect of gender (F[7, 294]=1.96, p<.001,η_p^2=.248), condition (F[21,845]=1.97, p=.003,η_p^2=.047), and time (F[14, 287]=8.99, p<.001,η_p^2=.305), but no significant interaction of time by condition (F[42, 852]=1.35, p=.07,η_p^2=.062), or time by gender (F[14, 287]=1.01, p=.363,η_p^2=.051) or time by condition by gender (F[42, 852]=1.07, p=.362,η_p^2=.049).

Univariate tests showed a main effect of time for intention (F[2, 608]=26.25, p<.001, η_p^2=.079), self-efficacy (F[2, 608]=17.74, p<.001,η_p^2=.055), anticipated regret (F[2, 608]=5.13, p=.006,η_p^2=.017), pill outcome beliefs (F[2, 608]=21.4, p<.001, η_p^2=.068), and normative beliefs (F[2, 608]=8.93, p<.001,η_p^2=.028). Univariate tests of the between-subjects IVs showed that none of the DVs differed significantly by intervention condition despite the significant multivariate F (all ps between .213 and .850). However, univariate tests showed that the main effect of gender existed for all of the DVs (all Fs fell between 13.82 and 69.34 and all p values were less than .001, all η_p^2 between .044 and .188).

Insert table 3 about here

Consultation of means for intention, self-efficacy, anticipated regret, pill outcome beliefs and normative beliefs by time suggested that in each case an increase in mean score occurred between T1 and T2 and between T2 and T3. The findings from pairwise comparisons are indicated in table 4 below. Significant p values for T1-T2 indicate immediate increases, while significant p values for T2-T3 and T1-T3 indicate later or sustained increases in scores.

Insert table 4 about here

Although there was a significant main effect of gender, there were no significant interactions between gender and the other IVs suggesting that differences between males and females, did not reflect a differential impact of the intervention. Consideration of means indicates that for each DV, males scored lower than females (see table 3).

Investigation of the significant main effect of time suggests that taking part in this study significantly increased participants' intentions to use contraception, their self-efficacy regarding use of contraception, their levels of anticipated regret regarding not using contraception, improved outcome beliefs about pill use, and the strength of their normative beliefs regarding use of contraception. These increases occurred regardless of intervention condition. The main effect for gender demonstrates that females have more positive beliefs and intentions regarding contraception, but increases observed do not differ by gender.

Effects for virgins and non-virgins

4(condition) x 3(time) MANOVAs were conducted separately on virgins and non-virgins, to assess differential intervention effects. This also enabled analysis of behavioural data among non-virgins. Findings were similar to the main analysis above for both sub-samples. There were main effects of time (virgins; $F[16, 129]=4.23$, $p<.001$, $\eta_p^2=.344$; non-virgins; $F[17, 87]=4.24$, $p<.001$, $\eta_p^2=.453$) but not condition (virgins; $F[24, 397.94]=1.21$, $p=.231$, $\eta_p^2=.066$; non-virgins; $F[27, 278.09]=1.44$, $p=.079$, $\eta_p^2=.119$). There was no significant interaction of time by condition (virgins; $F[48, 384.47]=.92$, $p=.62$, $\eta_p^2=.103$; non-virgins; $F[51, 259.82]=4.24$, $p=.168$, $\eta_p^2=.191$).

Amongst virgins, statistically significant increases were seen over time for intention ($F[2, 288]=14.89$, $p<.001$), self-efficacy ($F[2, 288]=17.81$, $p<.001$), pill outcome beliefs ($F[2, 288]=14.39$, $p<.001$), and normative beliefs ($F[2, 288]=7.72$, $p=.001$). Amongst non-virgins, statistically significant increases were seen over time for intention ($F[2, 206]=10.01$, $p<.001$), and pill outcome beliefs ($F[2, 206]=13.96$, $p<.001$). No significant increases in effective contraceptive use were found.

Intention to treat (ITT) analysis

ITT analysis was performed on the data to assess whether results differed if participants who had completed T2 and dropped out by T3 were included. Where T3 data were missing for participants' scores on the DVs, they were replaced with T1 data. Findings broadly replicated those reported above with a significant main effect of time ($F[14,261]=6.66$, $p<.001$, $\eta_p^2=.263$), a small significant main effect of condition but with a very small effect size ($F[21, 770.1]=1.72$, $p=.023$, $\eta_p^2=.043$), and no significant main effect of time x condition ($F[42,775]=.785$, $p=.834$, $\eta_p^2=.04$). Univariate tests for the main effect of time show that intention, efficacy, anticipated regret and pill and condom outcome beliefs all significantly increased (*p*s from .012 to <.001).

Effects on those with weaker intentions versus stronger intentions to use contraception

Baseline measures of intention to use contraception by participants were generally strong (overall T1 mean=5.69 on a scale of 1 to 7 where 7 is high). Although findings show a statistically significant increase in levels of intention to use contraception amongst all participants, it is possible that for a sub-group of non-virgin participants who had relatively lower levels of intention at the outset of the study, a shift in intention translated into significant improvements in contraceptive behaviour that are masked by the inclusion of *all* non-virgins in the analyses above.

Using a mean split (scores of 6.01 or below), a sub-sample of non-virgins whose intentions to use contraception were relatively low at the outset of the study were identified (N=84). Table 5 shows mean and standard deviations for this sub-sample on the DVs intention and behaviour by time, condition of the intervention and by gender (to again assess differential impact on behaviour in males compared with females). Behavioural data were only recorded at baseline (T1) and T3, so no T2 data are reported for this variable.

Insert table 5 about here

A 4(condition) x 2(gender) x 3(time) mixed MANOVA was conducted on the sub-sample of low intending non-virgins, with the dependent variables intention and behaviour. There was no significant main effect of condition ($F[6, 72]=1.57$, $p=0.169$, $\eta_p^2=.116$) or gender ($F[2, 36]=1.40$, $p=0.26$, $\eta_p^2=.072$). There was no significant interaction of time by condition ($F[9, 85]=1.25$, $p=0.275$, $\eta_p^2=.096$) or time by gender ($F[3, 35]=0.764$, $p=0.522$, $\eta_p^2=.061$) or time by condition by gender ($F[6, 70]=1.679$, $p=0.139$, $\eta_p^2=.126$). There was however, a highly significant main effect of time ($F[3, 35]=10.359$, $p<.001$, $\eta_p^2=.47$). Univariate tests suggest that the main effect of time was due to both intention ($F[1.89, 12.57]=18.17$, $p< 0.001$, $\eta_p^2=.329$) and behaviour ($F[1, 9.82]=4.76$, $p=0.036$, $\eta_p^2=.114$).

Consideration of means for the main effect of time suggested that intention increased from T1 (m=4.94) toT2 (m=5.80) and increased again by T3 (m=6.16). Pairwise comparisons for intention show that the increase between T1 and T2 was significant ($p<0.001$), as was the increase between T2 and T3 ($p<0.001$). Estimated marginal means for behaviour, measured at baseline and four-week follow-up, suggest that effective contraceptive behaviour increased from T1 (m=5.73) to T3 (m=6.39). Pairwise comparisons suggest that this increase was significant ($p<.001$).

These findings remain when the more conservative ITT analyses are run, showing no significant main effect of condition ($F[6,112]=1.78$, $p=.1$,$\eta_p^2=.087$), and no significant time by condition interaction ($F[9,168]=1.08$, $p=.382$,$\eta_p^2=.055$). The significant main effect of time remains ($F[3, 54]=11.86$, $p<.001$, $\eta_p^2=.397$).

Discussion

A significant interaction between time and condition, indicating self-efficacy and anticipated regret interventions improved motivation and behaviour compared to controls, was predicted.

Findings revealed significant increases in several DVs (intention, self-efficacy, anticipated regret, pill outcome beliefs and normative beliefs) over time, but this did not occur differentially by condition of the intervention. This was replicated amongst a sub-sample of virgins (with improvements in intention, self-efficacy, pill outcome beliefs and normative beliefs) and amongst non-virgins (with increases in intention and pill outcome beliefs). Self-reported contraceptive use did not increase amongst *all* non-virgins, but significant increases in intention and behaviour were observed amongst non-virgins with lower intentions to use contraception at baseline. All findings were replicated when ITT analyses were applied.

The finding that intervention conditions perform no better than controls, in sexual health intervention research with adolescents has been commonplace (Bennett & Assefi, 2005; Dicenso, Guyatt, Willan & Griffith, 2002; Robin, Dittus, Whitaker, et al., 2004). Congruent with explanations for similar findings provided by Wight, Raab, Henderson et al. (2002), it may be that more intense and frequent messages from wider social influences outweigh the impact of a brief task, or that more time was needed for impact to be observed. It is also possible that despite the messages used being based in our previous research, the beliefs focussed on did not represent the most salient for the sample, and that messages spread across condom *and* pill use may have weakened their effect.

The finding that several DVs increased over time, despite the lack of differentiation by condition, is important. Observed increases in intention to use contraception across the sample, and in self-reported use, for non-virgins with lower baseline intentions provide particular interest. Given the short duration of the present study, there is unlikely to be a developmental effect (cf. Ranjit, Bankole, Darroch & Singh, 2001). A 'Hawthorne' effect (Brenner, 2002) is also unlikely because changes in behaviour were reported by only some participants. An alternative explanation, is that the questionnaires (completed three times by most) were responsible for reactivity in participants (French & Sutton, 2010). Participants

who were exposed to the SE or IOC materials only, showed significant increases in anticipated regret which seems likely related to questionnaire exposure. Extant literature reports similar outcomes (e.g. Judd & Brauer, 1995; Reznick & Schwartz, 2001; Richard et al., 1996; Richard et al., 1998; Sheeran & Orbell, 1999). It is also possible that the effect of completing multiple questionnaire measures over three time points subsumed any differential effect the intervention conditions may have had.

The finding that behavioural change was only evident in sexually active participants with *relatively* low intentions to use contraception highlights the fact that many participants had high scores (mean for intention was 6.01 on 7 point scale) at baseline, making ceiling effects likely and limiting potential for intervention effect. Thirty-five percent of the sample demonstrated inconsistency between reporting very strong intention and consistent contraceptive use however, and as Sheeran, Milne, Webb & Gollwitzer (2005) suggest, for those with stronger intentions, the formation of implementation intentions (Gollwitzer, 1993), or 'if-then' plans, are likely to be more successful than motivational interventions at influencing behavioural change. In addition, interventions may need to consider factors beyond the cognitive/planning processes of the individual for behavioural outcomes to improve (e.g. behavioural skills including negotiation with sexual partner as proposed by Fisher and Fisher,1992; see also Henderson, Wight, Raab, et al., 2007).

Limitations

This study has several limitations. Firstly, although randomisation checks suggested no major problems, allocation of participants did not constitute true randomisation. An alternative approach is to cluster randomise, but given the relatively small scale of the current work and the need to accommodate time and facility restrictions of schools, blinded allocation was deemed a suitable alternative. This however provides a further limitation in that contamination across conditions may have occurred, providing a further potential

explanation for the lack of interaction effect.. This, coupled with a third limitation, reliance on potentially unreliable self-report data (Mitchell, Wellings, Elam et al., 2007), means that in relation to impact on behavioural change, the findings should be considered cautiously.

Implications of the findings and directions for future research

Despite these limitations, the findings provide some support for a theory-driven approach to classroom-based sex education. The questionnaires and intervention materials were based around theoretical concepts, and increases in psychological antecedents of contraceptive use and behaviour for some, were observed. Future research should therefore continue to investigate the utility of theory-driven intervention design with school-based sex education. Evidence from the current study also suggests that developing volitional and behavioural skills interventions for those already motivated may be critical if impacts on sexual health outcomes are to be seen. Finally, evidence that participants may have reacted to questionnaire measures has received recent attention with calls for further research to understand the reasons for this (French & Sutton, 2010). Researchers should account for such effects in the research design and report them to establish a stronger evidence base.

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Table 1. Descriptive information relating to participants at baseline (T1) and final follow-up (T3)

	Baseline (T1)	Final follow-up (T3)
Age range (in years)	14-19	14-20
Mean age (and s.d.)	17 (1.5 years)	17.1 (1.6 years)
No. of virgins (%)	121 (48.99)	115 (46.56)
No. of non-virgins (%)	126 (51.01)	132 (53.44)
No. of condom users (%)	51 (20.65)	55 (22.27)
No. of pill users (%)	72 (29.15)	73 (29.55)
No. of other method users (%)	0 (0)	1 (0.40)
No. reporting no method (%)	3 (1.21)	3 (1.21)

Table 2. Descriptive information relating to participants at baseline (T1) and their subsequent allocation to intervention condition

	Self-Efficacy (SE)	Anticipated Regret (AR)	SE/AR	Information Only Control
N	**72**	**86**	**79**	**78**
Age range (in years)	15-19	14-19	14-19	14-19
Mean age (and s.d.)	16.88 (1.47)	16.78 (1.52)	16.85 (1.39)	16.77 (1.63)
No. of males (%)	40 (55.6)	44 (51.2)	44 (55.7)	40 (51.3)
No. of virgins (%)	38 (52.8)	44 (51.2)	39 (49.4)	33 (42.3)
No. of non-virgins (%)	34 (47.2)	42 (48.8)	40 (50.6)	45 (57.7)
No. of condom users (%)	31 (43.1)	28 (32.6)	25 (31.6)	29 (37.2)
No. of pill users (%)	15 (29.15)	26 (30.2)	24 (30.4)	23 (29.5)
No. non-virgins reporting no method (%)	2 (2.78)	0 (0)	0 (0)	1 (1.28)

Table 3. Means (and standard deviations) for participants' scores on measures of the dependent variables across all three time points and by condition of the intervention and by gender of participant*

Variable (and score range; 1 = low)		Information Only Control Condition N = 77			Self-Efficacy (SE) condition N = 71			Anticipated Regret (AR) Condition N = 83			SE/AR Condition N = 77		
	Gender	T1	T2	T3	T1	T2	T3	T1	T2	T3	T1	T2	T3
Intention (1 to 7)	males	5.72 (1.3)	5.65 (1.5)	6.22 (1.0)	5.55 (1.2)	5.56 (0.9)	5.86 (1.1)	5.1 (1.3)	5.52 (1.0)	5.93 (0.9)	5.73 (1.0)	5.82 (1.0)	5.92 (0.8)
	females	5.86 (1.1)	6.38 (0.8)	6.69 (0.5)	6.18 (1.0)	6.22 (0.8)	6.5 (0.6)	5.75 (1.1)	6.23 (0.9)	6.44 (0.7)	6.28 (0.9)	5.88 (1.0)	6.13 (1.0)
Self-efficacy (1 to 7)	males	5.66 (0.8)	5.85 (0.9)	5.95 (0.8)	5.22 (1.1)	5.27 (1.0)	5.51 (1.1)	5.17 (1.0)	5.23 (1.1)	5.7 (0.8)	5.45 (0.8)	5.51 (0.9)	5.75 (0.6)
	females	5.82 (0.8)	5.89 (0.8)	6.05 (0.6)	5.69 (1.3)	5.86 (0.9)	6 (0.9)	6.23 (0.8)	6.26 (0.8)	6.26 (0.7)	6.05 (0.9)	6.03 (1.0)	6.11 (0.8)
Ant. Regret (1 to 7)	males	5.89 (0.8)	5.97 (0.8)	5.99 (0.8)	5.69 (0.8)	5.72 (0.8)	5.87 (0.8)	5.84 (0.5)	5.79 (0.9)	5.78 (0.9)	5.77 (0.8)	5.93 (0.6)	5.77 (0.7)
	females	6.12 (0.6)	6.23 (0.5)	6.36 (0.4)	6.09 (0.6)	6.24 (0.6)	6.17 (0.5)	6.21 (0.7)	6.44 (0.5)	6.33 (0.6)	6.14 (0.6)	6.3 (0.5)	6.14 (0.6)
Pill outcome beliefs (1 to 49)	males	38.49 (9.0)	39.61 (9.1)	39.47 (8.4)	38.29 (5.4)	38.07 (6.6)	36.15 (7.9)	35.76 (8.2)	36.66 (8.1)	35.45 (9.8)	38.23 (7.6)	39.42 (7.9)	39.69 (6.7)
	females	41.24 (6.4)	40.22 (7.4)	41.99 (4.4)	40.22 (5.6)	41.17 (6.4)	39.87 (6.9)	39.41 (6.0)	38.75 (9.1)	39.34 (6.0)	41.24 (5.7)	41.31 (5.7)	40.95 (7.0)
Condom outcome beliefs (1 to 49)	males	34.91 (8.3)	37.87 (8.3)	38.07 (6.9)	34.63 (4.9)	35.56 (6.0)	33.64 (7.9)	33.78 (7.1)	36.02 (7.4)	36.45 (7.7)	33.3 (6.9)	34.48 (8.0)	35.4 (7.6)
	females	38.68 (6.7)	41.26 (6.4)	42.81 (4.9)	38.7 (6.2)	40.72 (6.1)	41 (5.3)	39.98 (7.0)	41.49 (6.0)	42.66 (5.2)	39.64 (7.9)	41.45 (6.9)	41.57 (5.9)
Cont. beliefs (1 to 49)	males	25.62 (9.8)	23.59 (9.0)	23.12 (7.9)	20.49 (6.8)	21.05 (7.8)	21.31 (7)	20.24 (5.8)	20.23 (6.5)	20.87 (6.3)	21.32 (7.4)	20.86 (8.1)	21.02 (5.7)
	females	24.28 (9.2)	24.76 (9.1)	24.22 (8.0)	27.38 (9.5)	27.17 (10)	29.48 (11)	28.01 (8.4)	26.84 (8.7)	27.69 (7.9)	25.91 (8.0)	26.28 (7.6)	25.51 (7.0)
Norm beliefs (1 to 49)	males	24.53 (11)	24.32 (9.4)	26.74 (7.4)	20.29 (8.7)	22.3 (8.1)	24.72 (7.2)	21.44 (1.0)	23.90 (10)	22.43 (7.8)	22.03 (8.7)	22.56 (8.0)	24.13 (6.3)
	females	25.10 (8.2)	26.11 (10)	27.53 (7.4)	26.22 (8.4)	25.52 (8.3)	27.28 (9.4)	27.28 (8.5)	26.73 (9.4)	28.84 (7.6)	22.5 (9.2)	24.59 (8.8)	25.79 (9.2)

*****A higher score represents a more positive response towards contraceptive use.

Table 4. Significance (*p*) values for pairwise comparisons of DVs contributing to the main effect of time

Dependent variables	T1-T2 comparison	T2-T3 comparison	T1-T3 comparison
Intention	.032	<.001	<.001
Self-efficacy	.072	<.001	<.001
Anticipated regret	.001	.519	.03
Pill outcome beliefs	<.001	.381	<.001
Normative beliefs	.152	.004	<.001

Table 5. Means (and standard deviations) for low-intending non-virgins' scores across the three time points, by condition of the intervention and by gender

Variable (and score range; 1 = low)		**Information Only Control (IOC) Condition**			**Self-Efficacy (SE) Condition**			**Anticipated Regret (AR)Condition**			**SE/AR Condition**		
	Gender	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
Intention	**males**	N/A	N/A	N/A	4.44 (1.5)	4.56 (0.38)	4.89 (1.9)	5.13 (0.9)	5.4 (0.43)	6.47 (0.61)	5.33 (0.58)	6.51 (0.59)	6.0 (0.33)
(1 to 7)	**females**	4.63 (1.01)	6.07 (0.97)	6.9 (0.32)	4.78 (1.58)	6.67 (0.58)	6.78 (0.38)	5.0 (0.68)	6.24 (0.78)	6.64 (0.74)	5.22 (0.66)	5.17 (1.17)	5.44 (1.36)
Behaviour	**males**	N/A	N/A	N/A	5.0 (2.65)	N/A	7.0 (0)	6.6 (0.55)	N/A	6.2 (1.3)	5.33 (2.08)	N/A	7.0 (0)
(1 to 7)	**females**	6.1 (1.52)	N/A	6.4 (0.97)	5.67 (2.31)	N/A	6.0 (1)	6.57 (0.65)	N/A	6.79 (0.43)	4.83 (2.23)	N/A	5.33 (2.25)